



E-ISSN: 2709-9385

P-ISSN: 2709-9377

JCRFS 2024; 5(1): 10-12

© 2024 JCRFS

[www.foodresearchjournal.com](http://www.foodresearchjournal.com)

Received: 13-11-2023

Accepted: 21-12-2023

**Mateshwari Singh**

M.Sc., Department of Food Technology, Warner College of Dairy Technology, SHUATS, Allahabad, Uttar Pradesh, India

**Anu Kumari**

Assistant Professor, Warner College of Dairy Technology, SHUATS, Allahabad, Uttar Pradesh, India

**Gayatri Singh**

M.Sc., Department of Microbiology, Industrial Microbiology, Warner College of Dairy Technology, Sam Higginbottom University of Agriculture, Technology & Sciences, Allahabad, Uttar Pradesh, India

**Rakesh Kumar Yadav**

BA, Chatrapati Shahu Ji Maharaj University, Kanpur, Uttar Pradesh, India

## Sensory evaluation of newly developed bitter gourd (*Momordica charantia*) soft candy by the addition of different level of citric acid

**Mateshwari Singh, Anu Kumari, Gayatri Singh and Rakesh Kumar Yadav**

**Abstract**

Studies on the development of soft candies made from bitter gourds with various concentrations of citric acid in sugar syrup and water were carried out for this enquiry. 1.5% citric acid in water, 85% sugar concentration, and 1% citric acid in sugar syrup made up treatment T<sub>1</sub>; 1.5% citric acid in water, 85% sugar concentration, and 1.5% citric acid in sugar syrup made up treatment T<sub>2</sub>; and 1.5% citric acid in water, 85% sugar concentration, and 2% citric acid in water made up treatment T<sub>3</sub> and treatment T<sub>4</sub> was 2% citric acid in water, 85% sugar concentration and 1.5% citric acid in sugar syrup and treatment T<sub>5</sub> was 1% citric acid in water, 85% sugar concentration and 1.5% citric acid in sugar syrup. Where the concentration of 85% sugar syrup was all over the treatments. The main objective of the study is to evaluate the sensory evaluation of newly developed product.

**Keywords:** Bitter gourd, citric acid, candy, sugar syrup, sensory evaluation

**Introduction**

Bitter gourd (*Momordica Charantia*) has long been recognized for its unique bitter taste and extensive use in traditional medicine (Fang & Ng, 2011) [4]. This review aims to provide a comprehensive overview of the health benefits associated with bitter gourd consumption, drawing on recent scientific research. The focus will be on its potential positive effects on diabetes, cardiovascular health, immune function, and cancer prevention.

Bitter gourd, also known as bitter melon, is a tropical and subtropical vegetable that has been an integral part of traditional medicine in various cultures. Its distinctive bitter taste is attributed to the presence of bioactive compounds, including charantin, vicine, and polypeptide-p. Recent scientific studies have shed light on the numerous health benefits that bitter gourd may offer (Joseph & Jini, 2013) [5].

**Health benefits of bitter gourd**

One of the most extensively studied health benefits of bitter gourd is its potential in managing diabetes. Bitter gourd extracts have demonstrated hypoglycemic effects, helping to regulate blood glucose levels. A study by Kumari (2017) [6] found that bitter gourd extracts significantly improved glucose tolerance and insulin sensitivity in animal models. Bitter gourd has shown promise in promoting cardiovascular health by reducing cholesterol levels and improving lipid metabolism. The presence of bioactive compounds like *Momordica Charantia* Lectin (MCL) has been linked to these cardio-protective effects. Research suggests that bitter gourd consumption may contribute to lowering the risk of cardiovascular diseases (Czompa *et al.*, 2017) [2]. The immunomodulatory properties of bitter gourd have attracted attention in recent research. Bitter gourd extracts have been reported to enhance immune function by stimulating the production of immune cells and cytokines. Studies by Deng *et al.* (2014) [3] demonstrated the potential of bitter gourd in strengthening the immune response, which could be beneficial for overall health (Bhattacharya *et al.*, 2016) [1]. Preliminary studies indicate that bitter gourd may possess anti-cancer properties, attributed to its antioxidant and anti-inflammatory compounds. Research by Yung *et al.* (2016) [7] suggested that bitter gourd extracts may inhibit the growth of certain cancer cells and suppress tumor development. However, further research is needed to validate these findings and explore the potential role of bitter gourd in cancer prevention.

**Correspondence Author:****Anu Kumari**

Assistant Professor, Warner College of Dairy Technology, SHUATS, Allahabad, Uttar Pradesh, India

In this research study, candy was prepared from the bitter gourd with different percentage of citric acids. The main objective of this research study is to evaluate the sensory analysis of newly developed candy.

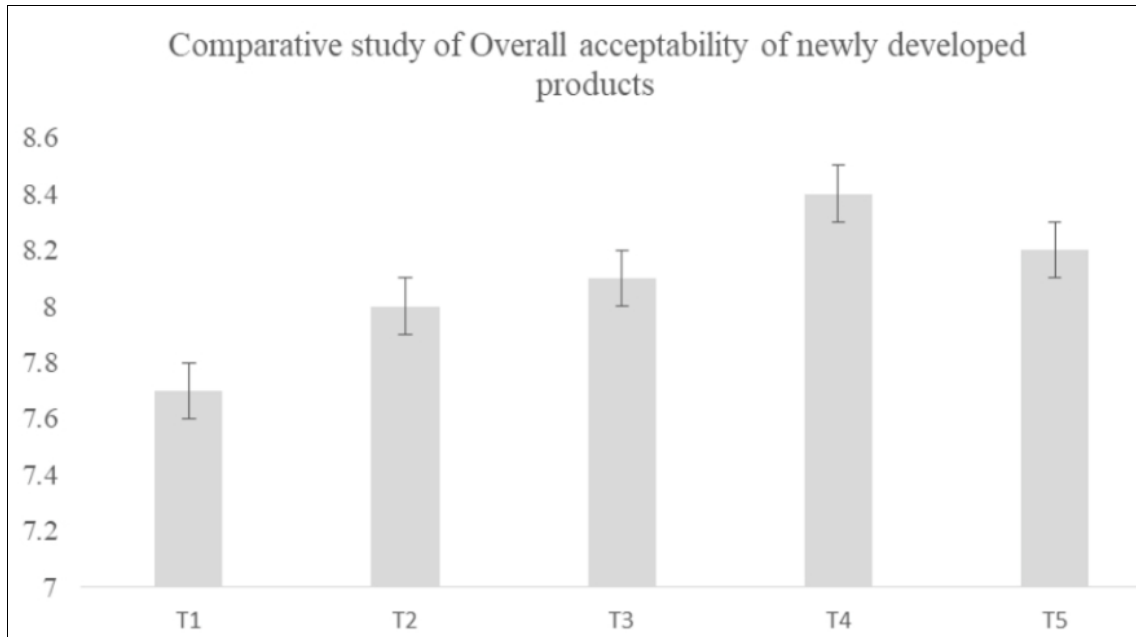
**Materials and Methods**

The present study was carried out in the food tech lab of warmer collage of dairy technology, Sam Higginbottom

University of Agriculture Technology & Sciences, Prayagraj (UP) India - 200117.

The material and methods to be adopted during this investigation are given below:

Bitter gourd, Citric acid and Sugar were collected from the local market of Prayagraj. Was collected from the local market of Prayagraj.



**Fig 1:** Diagram for preparation of bitter gourd candy

**Treatment combination for preparation of bitter gourd candy**

Treatment	Treatment Combination		
	Citric acid in water	Sugar	Citric acid in sugar syrup
T <sub>1</sub>	1.5%	85%	1%
T <sub>2</sub>	1.5%	85%	1.5%
T <sub>3</sub>	1.5%	85%	2%
T <sub>4</sub>	2%	85%	1.5%
T <sub>5</sub>	1%	85%	1.5%

**Table 1:** Sensory analysis of newly developed products

Treatment Combination	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>	T <sub>5</sub>
Colour and appearance	7.5	8	8	8.4	8.4
Body and texture	7.6	7.9	8.1	8.5	8.3
Flavour and taste	8	8.3	8.3	8.5	8.1
Overall acceptability	7.7	8	8.1	8.4	8.2

**Table 2:** Descriptive analysis of the data

Treatment	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>	T <sub>5</sub>
Mean	7.7000	8.0000	8.1000	8.4000	8.2000
Sample std. dev.	0.1000	0.1000	0.1000	0.1000	0.1000
Std. dev. of mean SE	0.0577	0.0577	0.0577	0.0577	0.0577

After analysis of descriptive statistics, it was found that the mean value (overall acceptability score) of T<sub>1</sub>, T<sub>2</sub>, T<sub>3</sub>, T<sub>4</sub> and T<sub>5</sub> were 7.7, 8, 8.1, 8.4 and 8.2 respectively.

**Table 3:** One-way ANOVA of the treatments

Source	Sum of squares SS	Degrees of freedom v	Mean square MS	F statistic	p-value
Treatment	0.8040	4	0.2010	20.1000	9.0221e-05
Error	0.1000	10	0.0100		
Total	0.9040	14			

Table 4: Tukey HSD results

Treatments pair	Tukey HSD Q statistic	Tukey HSD p-value	Tukey HSD inference
T <sub>1</sub> vs T <sub>2</sub>	5.1962	0.0276235	* $p < 0.05$
T <sub>1</sub> vs T <sub>3</sub>	6.9282	0.0043936	** $p < 0.01$
T <sub>1</sub> vs T <sub>4</sub>	12.1244	0.0010053	** $p < 0.01$
T <sub>1</sub> vs T <sub>5</sub>	8.6603	0.0010053	** $p < 0.01$
T <sub>2</sub> vs T <sub>3</sub>	1.7321	0.7198948	Insignificant
T <sub>2</sub> vs T <sub>4</sub>	6.9282	0.0043936	** $p < 0.01$
T <sub>2</sub> vs T <sub>5</sub>	3.4641	0.1791297	Insignificant
T <sub>3</sub> vs T <sub>4</sub>	5.1962	0.0276235	* $p < 0.05$
T <sub>3</sub> vs T <sub>5</sub>	1.7321	0.7198948	Insignificant
T <sub>4</sub> vs T <sub>5</sub>	3.4641	0.1791297	Insignificant

After analysis of sensory score, it was found that significant difference was found between T<sub>1</sub> and T<sub>2</sub>; T<sub>1</sub> and T<sub>3</sub>; T<sub>1</sub> and T<sub>4</sub>; T<sub>1</sub> and T<sub>5</sub>; T<sub>2</sub> and T<sub>4</sub>; and T<sub>3</sub> and T<sub>4</sub> and insignificantly difference between T<sub>2</sub> and T<sub>3</sub>; T<sub>2</sub> and T<sub>5</sub>; T<sub>3</sub> and T<sub>5</sub>; T<sub>4</sub> and T<sub>5</sub>.

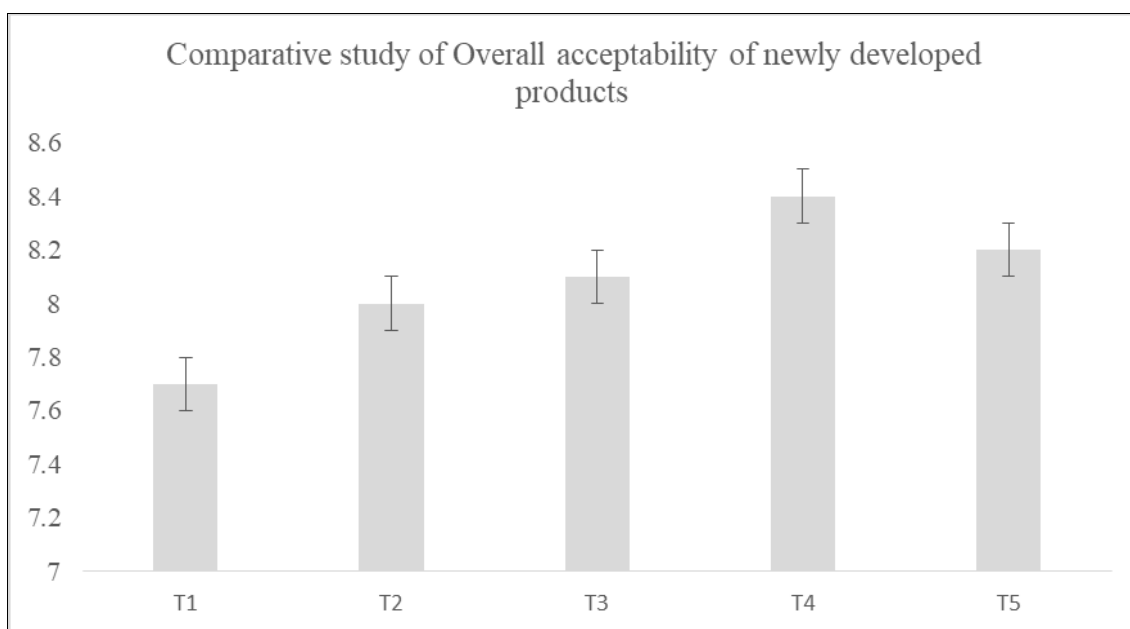


Fig 2: Comparative study of overall acceptability of newly developed products

### Conclusion

In conclusion, bitter gourd emerges as a promising vegetable with a plethora of potential health benefits. From diabetes management to cardiovascular health, immune function, and cancer prevention, bitter gourd's bioactive compounds showcase a range of therapeutic properties. However, it is essential to note that more extensive clinical studies are required to establish the efficacy and safety of bitter gourd in different health contexts. Incorporating bitter gourd into a balanced diet may be a step towards harnessing its full potential for health and well-being. After overall acceptability it was found that T<sub>4</sub> had higher score than other treatment combination

### References

- Bhattacharya S, Muhammad N, Steele R, Peng G, Ray RB. Immunomodulatory role of bitter melon extract in inhibition of head and neck squamous cell carcinoma growth. *Oncotarget*. 2016 Jun 7;7(22):33202.
- Czompa A, Gyongyosi A, Szoke K, Bak I, Csepanyi E, Haines DD, et al. Effects of *Momordica Charantia* (Bitter Melon) on ischemic diabetic myocardium. *Molecules*. 2017 Mar 22;22(3):488.
- Deng YY, Yi Y, Zhang LF, Zhang RF, Zhang Y, Wei ZC, et al. Immunomodulatory activity and partial

characterisation of polysaccharides from *Momordica Charantia*. *Molecules*. 2014 Sep 19;19(9):13432-47.

- Fang E, Ng TB. Bitter gourd (*Momordica Charantia*) is a cornucopia of health: A review of its credited antidiabetic, anti-HIV, and antitumor properties. *Curr Mol Med*. 2011 Jun 1;11(5):417-36.
- Joseph B, Jini D. Antidiabetic effects of *Momordica Charantia* (bitter melon) and its medicinal potency. *Asian Pac J Trop Dis*. 2013 Apr 1;3(2):93-102.
- Kumari P, Verma RB, Nayik GA, Solankey SS. Antioxidant potential and health benefits of Bitter gourd (*Momordica Charantia* L.). *J Postharvest Technol*. 2017;5:1-8.
- Yung MM, Ross FA, Hardie DG, Leung TH, Zhan J, Ngan HY, et al. Bitter melon (*Momordica Charantia*) extract inhibits tumorigenicity and overcomes cisplatin-resistance in ovarian cancer cells through targeting AMPK signaling cascade. *Integr Cancer Ther*. 2016 Sep;15(3):376-89.